

REMARKS

This application has been amended in a manner that is believed to place it in condition for allowance at the time of the next Official Action.

Claims 26-32 are pending in the application. Claims 26-29 have been amended to more particularly point out and distinctly claim the present invention. New claims 30-32 have been added. New claims 30-32 are directed to the method of the present invention. Support for new claims 30-32 may be found in previously pending claims 19, 24, and 25. Support may also be found in the present specification at page 5, line 30 to page 6, line 25, and page 7, lines 4-6. Claims 19-25 have been canceled.

Claims 19-25 were rejected under 35 USC §112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Applicants believe that the present amendment obviates this rejection.

Claims 26-29 were not subject to this rejection. Applicants believe that new claims 30-32 satisfy the requirements of 35 USC §112, first paragraph. Claims 30-32 are directed to method claims which utilize an expression vector which contains SEQ. ID No. 1, wherein a fragment of the sequence encodes for a protein having α -1,4-glucanotransferase enzymatic activity.

Moreover, the Examiner's attention is respectfully directed to the present specification wherein a method of transformation of plant cells is described at page 8, line 22, to page 9, line 23, and Example 5. Thus, the claimed method for modifying a starch produced by a plant is plainly recited and taught by the present specification.

As a result, applicants believe that claims 26-32 are supported by a sufficient written description.

In the outstanding Official Action, claims 19-25 were rejected under 35 USC §112, first paragraph, as allegedly being based on a non-enabling disclosure. This rejection is respectfully traversed.

Claims 26-29 were not subject to this rejection in the outstanding Official Action. As to claims 30-32, applicants believe that claims 30-32 are supported by the present disclosure. As the Examiner is aware, the expressed teaching of a patent specification cannot be controverted by mere speculation and unsupported assertions on the part of the Patent Office. As stated by the Court of Customs and Patent Appeals in the case of *In re Dinh-nguyen & Stenhagen*, 181 USPQ 46 (CCPA 1974):

Any assertion by the Patent Office that the enabling disclosure is not commensurate in scope with the protection sought must be supported by evidence or reasoning substantiating the doubts so expressed.

18 USPQ at 47.

That standard must be applied with special care and scrutiny when the conjecture set forth by the Patent Office is contrary to the teaching of the specification itself. Indeed, upon reviewing the contentions of the outstanding Official Action, applicants believe that it is apparent that no evidence is presented that is any way inconsistent with the teaching of the present specification.

Indeed, applicants respectfully submit that KOSSMAN et al. and WILLMITZER et al. fail to show that the claimed method is not enabled by the present disclosure.

The expression vector of the claimed invention contains SEQ ID No: 1, which encodes an α -1,4-glucanotransferase (D-enzyme) that has been isolated from *Chlamydomonas reinhardtii*. The present specification teaches that this algae stores a starch which is identical to that of plants, such as cereals, and contains the same biosynthesizing enzymes as these plants (page 17, lines 10-13).

The present specification also shows that mutant algae SV455, which are defective for a locus called STAl1 produce a starch with amylopectin chains of decreased length. This locus was further found to encode a 62 kD protein that has been identified as D-enzyme (see present specification at page 19, lines 6-12; page 10, lines 29-33; page 23, lines 16-21; and page 25, lines 20-25).

Thus, one skilled in the art would have understood that the D-enzyme is responsible in *C. reinhardtii* for the production of starch with amylopectin chains of increased length. This activity has been demonstrated in the instant application (see Figure 3 and Example 4.4).

Upon integration into a plant of SEQ ID No: 1 via a vector according to the claimed invention, D-enzyme is expressed in the plant where starch and starch biosynthetic enzymes are identical to starch and enzymes naturally occurring in *C. reinhardtii*. The plant D-enzyme interacts with its natural substrate according to the metabolic pathway as set forth in Figures 1 and 2. Indeed, D-enzyme fulfils its endogenous function when expressed in plants, i.e. modifies existing starch to increase the length of amylopectin side chains.

In imposing the rejection the Official Action contends that starch modification would be unpredictable because WILLMITZER et al. teach that Branching Enzyme antisense technology does not enable the modification of the amylose content nor total starch content of transformed plants.

However, the Examiner's attention is respectfully directed to Stark et al., Shewmaker and Stalker, and Wisser and Jacobson that have been previously submitted to the Examiner. Shewmaker and Stahler, for instance, report the successful modification of a starch composition (altered amylose/amylopectin ratios and starch content).

Indeed, applicants note that while WILLMITZER et al. and KOSSMAN et al. relate to amylose content or starch content, the articles do not relate to amylopectin chain length, as set forth in the claimed invention.

Thus, applicants believe that claims 30-32 are enabled by the present disclosure.

Claims 26-27 were rejected under 35 USC §101 because the claimed invention was allegedly directed to non-statutory subject matter. Applicants believe that the present amendment obviates this rejection.

Claims 26-27 have been amended to recite an isolated nucleic acid. Thus, it is believed that this rejection has been obviated.

In the outstanding Official Action, the claims were deemed free of prior art by the Examiner.

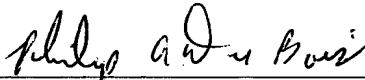
In view of the present amendment and the foregoing remarks, therefore, it is believed that this application is now in condition for allowance, with claims 26-32, as presented. Allowance and passage to issue on that basis are accordingly respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional
fees required under 37 C.F.R. \$1.16 or under 37 C.F.R.\$1.17.

Respectfully submitted,

YOUNG & THOMPSON



Philip A. DuBois, Reg. No. 50,696
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

PD/mjr